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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,584	10/24/2003	Naruhiko Nakanishi	8038-1047	6943
466	7590	04/05/2006	EXAMINER	
YOUNG & THOMPSON 745 SOUTH 23RD STREET 2ND FLOOR ARLINGTON, VA 22202			HA, NATHAN W	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 04/05/2006 ✓

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/691,584

Applicant(s)

NAKANISHI, NARUHIKO

Examiner

Nathan W. Ha

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10, 12-15 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10, 12-15 and 17-22 is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/06</u>  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weiner et al. (US 2002/0151107, previously cited, hereinafter, Weimer.)

In regard to claims 1 and 10, in fig. 1, Weimer discloses a method for forming a capacitor, comprising steps of:

depositing a strontium titanate film 32; and

heat treating the strontium titanate film at a temperature between 500-600 degrees C. See sections [0041] and [0042]. In several sections Weiner explicitly discloses a treat meant process that is used prior or after the wet oxidation process using inner gas such Argon (sections [0011], [0033]-0037].) The temperature is further disclosed as 500-700 degrees C.

Even Weiner does not disclose the exact range of the heat treating temperature as claimed, 500-650 degrees C. The range, which disclosed by Weiner, closely falls within the range as claimed, which is 500-600 degrees C. In some instances, Weiner teaches that this range may be 500-700 degree C. These ranges may be modified since they are close ranges and used in the same process as treating the layer. The

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difference of about 50 degrees C does not significantly alter the layer's properties, or damage the layer. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention was made to either reduce or increase the temperature of the treatment process without significantly effect the layer in order to stabilize a certain gas that might be use for the treatment process. Sections [0027 and 0041] confirm that the gas in the chamber is inert gas ambient, Argon, for example.

In regard to claims 2 and 7, Weimer further discloses the heat treating step crystallizes the strontium titanate film which is an amorphous film. See also section [0041], lines 3-15.

In regard to claims 3 and 8, wherein the inert gas includes nitrogen, N<sub>2</sub>. See section [0041] line 8.

In regard to claim 5, Weimer further discloses:

forming a bottom electrode 30 overlying a semiconductor substrate 2. See also section [0036], line 5;

depositing a strontium titanate film on the bottom electrode;

forming a top electrode 36 on the strontium titanate film. See section [0022] line 6; and

heat treating the strontium titanate film at a temperature as discussed above regarding claim 1.

In regard to claim 6, includes a silicon layer, polycrystalline. See section [0036], lines 3-5. It should be noted that a silicon nitride is formed thereon. Therefore, the bottom electrode includes plurality of layers.

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In regard to claims 4 and 9, Weimer discloses all of the claimed limitations as mentioned above. Weimer further the heat-treating process can be on order of several minutes. See section [0041] lines 14-17. Weimer, however, does not disclose the exact a time interval for the process as claimed in claims 4 and 9. But the phrase "several minutes" should be approximate to "5 seconds to 5 minutes". In fact, it is obvious since the dielectric layer is formed by using the same process and the same material.

Therefore, it would have been obvious to one of ordinary skill in the art to recognize the similarity and obviousness that these times are approximately same values and not critical because they can be optimized during routine experimentation, or during the process of making the device.

#### ***Allowable Subject Matter***

3. Claims 10, 12-15, and 17-22 are allowed.

#### ***Response to Arguments***

4. Applicant's arguments filed 1/25/06 have been fully considered but they are not persuasive. For instance, Applicants contend that the cited art does not teach that the heat treatment temperature is in the range as claimed. This limitation can be found in section [0033] where the dielectric layer is treated using RTP process in a preferred temperature ranch of about 450-750 degrees C. The newly ground of rejections above obviates how the range as claimed can be altered but does not effect the layer's

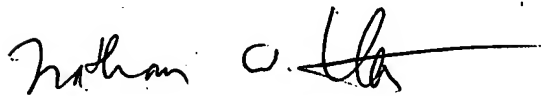
properties. Sections [0027 and 0041] further confirm the Argon gas is inert gas and in ambient condition.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (571) 272-1707. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Nathan W. Ha", followed by a long horizontal flourish line.

Nathan Ha  
April 2, 2006